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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,678	09/07/2006	Ulf Skarby	P18921-US1	8758

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EXAMINER	
DAGLAWI, AMAR A	
ART UNIT	PAPER NUMBER
2618	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/598,678	SKARBY ET AL.	
	Examiner	Art Unit	
	AMAR DAGLAWI	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-29 and 31-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-29 and 31-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Claims 1-16 have been cancelled. Claim 30 is cancelled. Claims 17-29, 31-34 are pending in the current communication. The Amendment has been entered.

Response to Arguments

1. Applicant's arguments with respect to claims 17-29, 31-34 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 17-29, 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by De Marco (US 6,047,199).

With respect to claim 17, De Marco teaches A method for reducing the number of feeders between a radio base station and a receiver diversity antenna arrangement that comprises at least two-antennas that are spaced apart and/or that have different polarizations, each antenna being adapted for reception of individual radio frequency (RF) signal transmitted from the same transmitter, where each RF signal received at each of the spaced apart antennas is at the same frequency and carries the same information, said method comprising the steps of:

converting one or more received antenna signals into a corresponding number of different frequency (4-F-)-signals by mixing with a first set of a corresponding number of reference signals (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53); forwarding the diversity signals received on all the antennas of the receiver diversity antenna arrangement, of which one or more have been frequency converted to the base station on a single feeder (Fig.1, fig.2, fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53); and

diversity processing two or more of the forwarded diversity signals to obtain a single enhanced received signal corresponding to the transmitted signal (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53).

With respect to claim 18, De Marco further teaches converting all received antenna signals except one and forwarding the non-converted antenna signal together with all frequency-converted t-g signals to the radio base station on the single feeder, thus providing n-way diversity with a single feeder (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53).

With respect to claim 19, De Marco further teaches the diversity antenna arrangement comprises n antennas, said method comprising the step of converting all received antenna signals and forwarding them to the radio base station on the single feeder, thus providing n-way diversity with a single feeder (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53).

With respect to claim 20, De Marco further teaches converting the IF-frequency-converted signals to other frequencies by mixing them with a second set of reference signals in order to obtain another set often frequency-converted signals which are forwarded to the base station on the single feeder (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53).

With respect to claim 21, De Marco further teaches the diversity antenna arrangement comprises a first and a second antenna, said method comprising the steps of: converting the antenna signal on the second antenna into an intermediate (IF) signal and forwarding the IF signal together with the non-converted antenna signal on the first antenna to the radio base station on a single feeder, thus providing 2-way diversity with a single feeder (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53).

With respect to claim 22, De Marco further teaches converting the RF signals from the second and fourth antennas into first and second intermediate frequency (IF) signals, both of the same intermediate frequency; forwarding the non-converted antenna signal on the first antenna together with the first IF signal on a first feeder to the base station; and; forwarding the non-converted antenna signal on the third antenna together with the second IF signal on a second feeder to the base station, thus providing 4-way diversity with two feeders (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53).

With respect to claim 23, De Marco further teaches converting, at the radio base station, the frequency-converted signals into other frequency-converted signals, all on the same intermediate frequency, by mixing them with a set of reference signals and subjecting the twice frequency converted signals on the common intermediate frequency to the diversity signal processing (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53).

With respect to claim 24, De Marco teaches A receiver diversity antenna arrangement, comprising: at least two diversity antennas that are spaced apart and/or that have different polarizations, each antenna being adapted for reception of individual radio frequency (RF) signal transmitted from the same transmitter, where each -said-RF signal is the same frequency and carries the same information;

one or more frequency converters each adapted to convert a respective antenna signal to a respective different frequency signal (J-F-) by mixing it with a predetermined frequency (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53) ;

a combiner for combining the signals received on all-the antennas, of which signals one or more have been frequency converted, to form a composite signal which is forwarded to a radio base station on a single feeder (Fig.1, fig.2, fig.3A, col.3, lines 1-67, col.5, lines 20-67, col.6, lines 1-53); and

a diversity processor for diversity processing two or more of the forwarded diversity signals to obtain a single enhanced received signal corresponding to the transmitted signal (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 25, De Marco further teaches wherein a signal from a diversity antenna follows a diversity branch, the receiver diversity antenna arrangement further comprising characterized providing a frequency converter in each diversity branch except one (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 26, De Marco further teaches a signal from a diversity antenna follows a diversity branch receiver diversity antenna arrangement further comprising providing a frequency converter in each diversity branch (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 27, De Marco further teaches wherein a second set of frequency converters are adapted to convert the frequency converted signals into another set of frequency converted signals for transport to the radio base station on the single feeder (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 28, De Marco further teaches a single frequency converter converting the antenna signal from the second antenna to an intermediate frequency to form an IF signal, wherein the combiner is configured to combining the original RX signal from the first antenna with the IF signal into a composite signal, and a-the single feeder is configured to forwarding the composite signal to the base station, thus providing 2-way diversity with one feeder (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 29, De Marco further teaches a duplicate diversity antenna arrangement to provide a composite diversity antenna arrangement comprising four antennas and two feeders, each antenna arrangement comprising a respective single feeder, thus providing 4-way diversity with two feeders (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 31, De Marco further teaches a receiver diversity antenna (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 32, De Marco further teaches a site comprising a radio base station (RBS) coupled to at least one tower mounted unit (TMA) via singe feeder and including a receiver diversity antenna arrangement (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 33, De Marco further teaches the two antennas are spaced apart and each of the two spaced apart antennas has different polarization (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

With respect to claim 34, De Marco further teaches the two antennas are paced apart and each of the two spaced apart antennas has different polarization (Fig.1, Fig.2, Fig.3A, col.3, lines 1-67, col.5, ,lines 20-67, col.6, lines 1-53).

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

5. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. See Scott (5,859,842) that teaches antenna diversity techniques.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMAR DAGLAWI whose telephone number is (571)270-1221. The examiner can normally be reached on Monday- Friday (7:30 AM- 5:00 AM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NGUYEN DUC can be reached on 571-272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amar Daglawi
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